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EIC 2800

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571-272-2511, JEF 4B68

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  - ☐ 102 rejection
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  - ☐ Cited as being of interest.
  - ☐ Helped examiner better understand the invention.
  - ☐ Helped examiner better understand the state of the art in their technology.

  Types of relevant prior art found:
  - ☐ Foreign Patent(s)
  - ☐ Non-Patent Literature
    (journal articles, conference proceedings, new product announcements etc.)
- *Relevant prior art **not found:***
  - ☐ Results verified the lack of relevant prior art (helped determine patentability).
  - ☐ Results were not useful in determining patentability or understanding the invention.

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Search and Information Resources Administration

L17 ANSWER 1 OF 33 HCAPLUS COPYRIGHT 2004 ACS on STN

AN 2001:722315 HCAPLUS Full-text

DN 136:13848

TI Mechanisms of inert gas impact induced interlayer mixing in metal multilayers grown by sputter deposition

AU Zhou, X. W.; Wadley, H. N. G.

CS Intelligent Processing of Materials Laboratory, Department of Materials Science and Engineering, School of Engineering and Applied Science, University of Virginia, Charlottesville, VA, 22903, USA

SO Journal of Applied Physics (2001), 90(7), 3359-3366
CODEN: JAPIAU; ISSN: 0021-8979

PB American Institute of Physics

AB Control of interfacial roughness and chemical mixing is critical in nanomaterials. For example, multilayers composed of .apprx.20 Å conductive layer sandwiched between two .apprx.50 Å ferromagnetic layers can exhibit giant magnetoresistance (GMR). This property has caused a tremendous recent increase in hard disk storage capacity, and can potentially result in a new generation of nonvolatile **magnetic random access** memories. Good GMR properties can be obtained when the interfacial roughness and interlayer mixing of these multilayers are low. However, **flat** interfaces in nanoscale multilayers are not thermodynamically stable, and cannot be obtained using thermal energy deposition processes such as MBE. Hyperthermal energy sputter deposition techniques using either plasma or ion-beam gun are able to create nonequil. **flat** interfaces, and produce better GMR multilayers. In these processes, however, inert gas ions or neutrals with energies between 50 and 200 eV can impact the growth surface. This may be a major source for interlayer mixing. By using a mol. dynamics technique and a reduced order model, the composition profile across the thickness of multiply repeated Ni/Cu/Ni multilayers was calculated as a function of the energy and the relative flux of the inert gas ions or neutrals as well as the layer thickness. The results indicate that the 50-200 eV inert gas impact caused atomic exchange between adjacent atomic layers near the surface. The probability of exchange increased with impact energy, but decreased with the number of overlayers. The exchange between Ni overlayer and Cu underlayer atoms was much more significant than that between Cu overlayer and Ni underlayer atoms. As a result, the Ni on Cu interfaces were much more diffuse than the Cu on Ni interfaces, in good agreement with expts. At very high inert gas flux and impact energy, an increased probability for the underlying Cu atoms to be exchanged to the surface resulted in significant Cu surface segregation.

CC 76-12 (Electric Phenomena)
Section cross-reference(s): 56, 66

L17 ANSWER 2 OF 33 HCAPLUS COPYRIGHT 2004 ACS on STN

AN 2001:326797 HCAPLUS Full-text

DN 135:69844

TI Two-dimensional topological solitons in rectangular magnetic dots

AU Metlov, Konstantin

CS Institute Physics ASCR, Prague, CZ-18221, Czech Rep.

SO Los Alamos National Laboratory, Preprint Archive, Condensed Matter (2001) 1-3, arXiv:cond-mat/0105072, 3 May 2001
CODEN: LNCMFR
URL: http://xxx.lanl.gov/pdf/cond-mat/0105072

PB Los Alamos National Laboratory

AB A general approach allowing to find the anal. expressions for equilibrium magnetic structures in small and **flat** magnetic nano-sized cylinders of arbitrary **shape** made of soft magnetic material is presented. The resulting magnetization distributions are two-dimensional topol. solitons and have a nonzero topol. charge. The approach is illustrated here on an example of a thin rectangular particle.

CC 77-1 (Magnetic Phenomena)

IT Distribution function
Magnetization
Memory devices
Quantum dot devices
Solitons
(**magnetization** distribution and two-dimensional topol. solitons in rectangular **magnetic** dots)

L17 ANSWER 4 OF 33 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1999:601791 HCAPLUS Full-text
DN 131:316220
TI Epitaxial growth of atomically **flat spin dependent tunneling** junctions
AU Li, Y.; Wang, S. X.; Mancoff, F. B.; Clemens, B. M.
CS Department of Material Science and Engineering, Stanford University, Stanford, CA, 94305, USA
SO Materials Research Society Symposium Proceedings (1999), 570(Epitaxial Growth--Principles and Applications), 73-78
CODEN: MRSPDH; ISSN: 0272-9172
PB Materials Research Society
AB **Spin dependent tunneling** junctions with epitaxially grown underlayers were studied to examine the possibility of achieving very **flat** and uniform barrier layers. Pt/Ni80Fe20/Fe50Mn50/Ni80Fe20 layers were deposited on sapphire (0001) substrates at different temps. and monitored by in-situ RHEED. The surface morphol. depends strongly on the growth temperature X-ray diffraction and magnetic hysteresis loop measurements were also performed to characterize the film structures.
CC 76-2 (Electric Phenomena)
Section cross-reference(s): 75, 77
IT Sputtering
(epitaxy; sputter epitaxy of atomically **flat spin dependent tunneling** junctions)
IT Magnetic hysteresis
Surface reconstruction
Surface structure
(from sputter epitaxy of atomically **flat spin dependent tunneling** junctions)
IT Tunnel junctions
(sputter epitaxy of atomically **flat spin dependent tunneling** junctions)
IT Epitaxy
(sputter; sputter epitaxy of atomically **flat spin dependent tunneling** junctions)
IT Temperature
(substrate; in sputter epitaxy of atomically **flat spin dependent tunneling** junctions)
IT 7440-06-4, Platinum, processes 11148-13-3, Iron 20, nickel 80 (atomic) 51403-40-8, Iron 50, manganese 50 (atomic)
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(sputter epitaxy of atomically **flat spin dependent tunneling** junctions from)
IT 1344-28-1, Aluminum oxide (Al2O3), processes
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(substrate; in sputter epitaxy of atomically **flat spin dependent tunneling** junctions)

L17 ANSWER 5 OF 33 HCAPLUS COPYRIGHT 2004 ACS on STN

AN 1999:599703 HCAPLUS Full-text

DN 131:330474

TI Fabrication of an insulating barrier in tunneling magnetoresistance ferromagnetic tunnel junctions

AU Baek, J. Y.; Hyun, J. W.

CS Department of Physics, Dankook University, Chungnam, 330-714, S. Korea

SO Han'guk Pyomyon Konghak Hoechi (1999), 32(1), 61-66
CODEN: HPKHEL; ISSN: 1225-8024

PB Korean Institute of Surface Engineering

AB The **Spin-dependent tunneling** magnetoresistance (TMR) effect was observed in NiFe/Al2O3/Co thin films. The samples were prepared by magnetron sputtering in a system with a base pressure of 3+10-6 Torr. The insulating Al2O3 layer was prepared by r.f. plasma oxydation method of a metallic Al layer. The ferromagnetic and insulating layers were deposited through metallic masks to produce the cross pattern form. The junction has an active area of 0.3+0.3mm2 and the Al2O3 layer is deposited through a circular mask with a diameter of 1 mm. It is very important that insulating layer is formed very thinly and uniformly in tunneling junction. The ferromagnetic layer was fabricated in optimum conditions and the surface of that was very **flat**, which was observed by AFM. Tunneling junction was confirmed through nonlinear I-V curve. NiFe/Al2O3/Co junction was observed for magnetization behavior and magnetoresistance property and magnetoresistance property is dependent on magnetization behavior of two ferromagnetic layers. The maximum magnetoresistance ratio was about 6.5%.

CC 76-2 (Electric Phenomena)

L17 ANSWER 12 OF 33 HCAPLUS COPYRIGHT 2004 ACS on STN

AN 1991:477044 HCAPLUS Full-text

DN 115:77044

TI Effect of the production process on silicon nitride film characteristics

AU Kirino, Fumiyoshi; Mutou, Akiko; Ohta, Norio

CS Cent. Res. Lab., Hitachi, Ltd., Kokubunji, Japan

SO Nippon Kinzoku Gakkaishi (1991), 55(6), 706-14

CODEN: NIKGAV; ISSN: 0021-4876

AB SiNx films are widely used as protection and Kerr enhancement films for magnetooptical disks. The characteristics of SiNx films produced by reaction sputtering using a Si target were studied by FTIR, Auger electron spectroscopy, a microscope, an x-ray diffraction meter, and the ESCA method. The film, produced by a pass-by-type sputtering apparatus, a low sputtering gas pressure, and a short length between the target and the substrate, did not contain O. The reaction sputtering method had little effect on the sputtering condition. O was not contained in the film using this production condition. The magnetooptical recording film was corroded if the SiNx film containing O was used as Kerr enhancement and protection film. N possessed 1 bonding order, independent of the production process, while the Si bonding order was process dependent. The surface of the film was **flat** and amorphous. A magnetooptical disk using the SiNx films had no problems such as an increased noise level.

CC 57-2 (Ceramics)

IT **Memory devices**

(**magnetic**, optical, silicon nitride sputtered films for, processing property relations of)

L17 ANSWER 14 OF 33 HCAPLUS
AN 1991:212432 HCAPLUS Full-text
DN 114:212432
TI New glass substrate
AU Nagarekawa, Osamu
CS HOYA Corp., Hachioji, Japan
SO Kagaku Kogyo (1990), 41(8), 698-706
CODEN: KAKOAY; ISSN: 0451-2014
AB A review, with 10 refs., of phys., chemical, structural, and elec. characteristics of glass substrates for photomask, **flat** display panel, and magnetic and magnetooptical memory disk applications.
CC 57-0 (Ceramics)
Section cross-reference(s): 74, 76, 77
IT **Memory devices**
(**magnetic** or **magnetooptical** disks, glass substrates for)
IT Glass, oxide
RL: USES (Uses)
(substrates, for photomask and **flat** display panel and magnetic and magnetooptical memory disk)

L17 ANSWER 15 OF 33 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1991:194753 HCAPLUS Full-text
DN 114:194753
TI The dependence of the corrosion behavior of rigid magnetic memory disks on the deposition conditions of the underlayer, magnetic layer, and carbon overcoat
AU Sides, Paul J.
CS Dep. Chem. Eng., Carnegie Mellon Univ., Pittsburgh, PA, 15213, USA
SO Proceedings - Electrochemical Society (1991), 91-2(Proc. Int. Symp. Corros. Electron. Mater. Devices, 1st, 1990), 135-51
CODEN: PESODO; ISSN: 0161-6374
AB The electrochem. response of rigid disk samples prepared by d.c. magnetron sputtering and immersed in 3 weight% KCl aqueous solution was investigated. Most of the disk samples had the formulation /C/CoNi/NiP/Cr/AlMg; the others had no carbon overcoat. The Ar pressure and sputtering power during sample preparation were varied between 5 and 15 mtorr and between .5 and 1.5 kW, resp. Electrochem. impedance anal. and linear sweep voltammetry yielded values for the double layer capacitance and the faradaic resistance that characterize the ability of the films to resist corrosion. The chromium underlayer affected the corrosion properties of the films most strongly; an Ar pressure of 5 mtorr and RF power of 1.5 kW for the Cr deposition yielded corrosion-resistant films, but values of 15 mtorr and 0.5 kW yielded easily corroded films (deposition conditions of the other layers being held constant). The corrosion-resistant films were **flat** and relatively featureless and the crystalline quality of the magnetic layer was good. The films susceptible to corrosion were rough with sharp edges and possible microgaps in the carbon layer while the magnetic layer had poor crystalline quality.
CC 72-6 (Electrochemistry)
Section cross-reference(s): 56, 76, 77
IT **Memory devices**
(**magnetic,** disks, corrosion of, in potassium chloride solution, effect of **underlayer** and **magnetic** layer and carbon overcoat on)

L17 ANSWER 19 OF 33 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1983:604945 HCAPLUS Full-text
DN 99:204945
TI Preparation of magnetic bubble garnet film
PA Hitachi, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 2 pp.
CODEN: JKXXAF

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 58127310	A2	19830729	JP 1982-8947	19820125
PRAI	JP 1982-8947		19820125		

AB A bubble-domain ferrite garnet film for memory devices without magnetic defects and high adherence to a photomask during processing is produced by smoothing the film surface after epitaxy by a high-power laser irradiation Thus, a (Y,Sm,Lu,Ca)(Fe,Ge)5O12 film was epitaxially grown on a Gd3Ga5O12 substrate and irradiated with a pulsed (10 ns) laser beam of intensity 2 + 108 W/cm2 to give a **flat** film for bubble memory devices.
IC H01F041-28; G11C011-14; G11C019-08
CC 77-3 (Magnetic Phenomena)
IT **Memory devices**
(**magnetic** bubble, laser smoothing of ferrite garnet films for)

L17 ANSWER 21 OF 33 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1979:621469 HCAPLUS Full-text
DN 91:221469
TI Study of a chemical method of making low-coercivity channels for propagation of **flat** magnetic domains
AU Vasilieva, N. P.; Maliutin, V. Yu.; Kulicov, Yu. S.; Gal, Felix A.
CS Inst. Control Sci., Moscow, USSR
SO IEEE Transactions on Magnetics (1979), MAG-15(5), 1339-42
CODEN: IEMGAQ; ISSN: 0018-9464
AB Static magnetic characteristics and film surface structure were studied in relation to a chemical method of producing a hard magnetic layer around low coercivity channels. Applicability of the channels obtained was studied from the viewpoint of their ability to provide functionally stable propagation of **flat** magnetic domains. Probability of a false domain occurrence in propagation steps strongly depends upon the coercivity of the hard magnetic layer, magnetic properties, and **shape** of the low-coercivity channels and the parameters of the control fields, and may be well described by the exponential law in the area of small values for one transfer cycle per one bit (P1/1). Certain types of channels with certain values of hard magnetic layer coercivity and domain nucleation field have an area in which the value of the required erase field is practically independent of the propagation field. The study and computations show that the chemical method is capable of providing sufficiently low values of P1/1. The mechanism of false domain occurrence was not studied.
CC 77-1 (Magnetic Phenomena)
IT **Memory devices**
(**magnetic flat** domain propagation in films for, etching of low-coercivity channels for)
IT Magnetic domain
(propagation of **flat,** etching of low-coercivity channels for, in cobalt-iron-nickel alloy films)
IT 12647-03-9
RL: PRP (Properties)
(magnetic **flat** domain propagation in memory films of, low-coercivity channel etching for)

L17 ANSWER 25 OF 33 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1975:10083 HCAPLUS Full-text
DN 82:10083
TI Liquid/solid interface profile of melt grown oxide crystals. I. Czochralski growth
AU Perner, B.; Kvapil, J.; Kvapil, Jos.
CS Turnov, Czech.
SO Czechoslovak Journal of Physics (1974), 24(10), 1091-6
CODEN: CZYPAO; ISSN: 0011-4626
AB The relation between temperature gradient and the liquid/solid interface profile of Czochralski grown Al2O3 and Y Al garnet crystals is described. Lowering the radial component as well as increasing the axial component of temperature gradient during crystal growth causes the convex or pointed interface to be **flattened**. In the range of magnitudes for both of the components of temperature gradient used, 4 types of interface profiles were found. An alteration of the interface profile which causes local increase of the growth rate can be accompanied by cell formation. The volume of the portion of the growing crystal submerged in the melt is directly proportional to the optical transmissivity of the crystal and inversely proportional to the optical transmissivity of the melt.
CC 75-1 (Crystallization and Crystal Structure)
IT **Memory devices**
(**magnetic**, rare earth garnet crystals for, growth of)

L17 ANSWER 30 OF 33 HCAPLUS
AN 1966:434974 HCAPLUS Full-text
DN 65:34974
OREF 65:6491g-h,6492a
TI Demagnetizing and stray fields of elliptical films
AU Chang, H.; Burns, J.
CS Intern. Business Machine Watson Res. Center, Yorktown Heights, NY
SO Journal of Applied Physics (1966), 37(8), 3240-5
CODEN: JAPIAU; ISSN: 0021-8979
AB The magnetostatic fields inside and outside of a ferromagnetic thin film, called demagnetizing and stray fields, resp., are known to be calculable from the model of a uniformly magnetized **flat** ellipsoid. These fields are plotted as functions of the spatial coordinates with the aspect ratios b/a and c/a as parameters. The information is applied to a number of magnetic thin-film device and physics problems. Demagnetizing fields influence wall motion threshold, **shape** anisotropy, and the stability of domain configuration. Stray fields affect the creeping and switching thresholds of memory elements in an array. The effectiveness of demagnetizing field reduction in a film pair dictates the drive line configuration. In films coupled magnetostatically or by exchange force, the **planar** components of stray field are important in determining both the quasistatic and dynamic magnetization reversals. However, the normal component of stray field, being much smaller than the normal component of demagnetizing field, has no significant effect on switching.
CC 9 (Electric and Magnetic Phenomena)
IT **Memory devices**
(from **magnetic** (ferro-) films, creeping and switching thresholds of, effect of stray fields on)

L17 ANSWER 32 OF 33 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1965:421307 HCAPLUS Full-text
DN 63:21307
OREF 63:3757e-g
TI Thin conductive supports for magnetic memory elements
PA Sperry Rand Corp.
SO 4 pp.

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
PI	GB 992368		19650519	GB		<--
	NL 297713			NL		
PRAI	US		19620910 <--			

AB Uniformly smooth **flat** supports for magnetic Ni-Fe films sufficiently thin for close positioning of the driving current loop to the storage film in memory devices, are formed by vapor or chemical deposition of a conductive metal film on a polished **flat** glass surface, thickening the film to 5-10 mils by electrolysis, and stripping the deposit from the glass for application of the magnetic Ni-Fe layer on the surface smoothed by the glass contact. Oxidation of that surface must be carefully prevented, and can be assured by making the 1st layer on the glass of Ag, Pd, Au, or Cr. A glass surface was cleaned and polished with a thick CaCO3 paste for this purpose, and mildly sandblasted around the edges of the area to receive the metallic deposit. A sensitizing solution containing 70 g./l. SnCl2.2H2O and 40 ml. concentrated HCl was applied 4 min. at room temperature and followed by 4 min. activation in a solution containing 0.1 g./l. PdCl2.2H2O and 1 ml./l. HCl at 110°F. and 3.5-4.5 pH. Cu was then deposited by 4 min. immersion in a solution of CuSO4 66.5, K2SO4 8, NaK tartrate 336.8, NaOH 94.5 g./gal. and 37% formaldehyde 25 ml./gal. at 90°F. The Cu deposit was thickened electrolytically in a sulfate bath at 30 amp./ft.2 c.d. to 10 mils, washed, dried, and stripped from the glass.
IC C23B; C23C
CC 9 (Electric and Magnetic Phenomena)
IT **Memory devices**
(copper foil substrate for **magnetic**)

L17 ANSWER 33 OF 33 HCAPLUS
AN 1962:427404 HCAPLUS Full-text
DN 57:27404
OREF 57:5463d-f,5464a
TI Magnetic film elements
PA International Business Machines Corp.
SO 4 pp.

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
PI	GB 888762		19620207	GB		<--
PRAI	US		19581118 <--			

AB By application of a magnetic field, it is possible to reverse directions of magnetization by either a rotational coercive force or a wall-motion coercive force. By making a thin film, the more rapid rotational coercive force is enhanced at the expense of the output signal. By using a series of closely spaced parallel serrations on a substrate and depositing a magnetic film of uniform thickness on it, it is possible to control the direction of magnetization. The direction of magnetization is parallel to the serrations. The magnitude of the coercive force varies with the dimensions of the grooves, making it possible to obtain a wide range of magnetic properties. Cu can be used as substrate with grooves caused by abrasives such as Abrasive Paper 320. A thin magnetic film of 80% Ni-20% Fe is deposited by methods, such as vacuum evaporation or electrodeposition, giving a uniform thickness of 2000-10,000 A. For a given amount of metal, the film thickness is less than that for a **flat** film, giving a high rotational coercive force and a high signal output. The serrations have a **peak**-to-valley height of .apprx.8 μ, a **peak** -to-**peak** distance of 48 μ, and a lateral **peak** -to-valley distance of 25 μ. The magnetic film element is electroplated on the Cu.
CC 9 (Electric and Magnetic Phenomena)
IT **Memory devices**
(films for, with controlled **magnetization** direction)

L17 ANSWER 17 OF 33 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1985:603430 HCAPLUS Full-text
DN 103:203430
TI Polishing technique for gadolinium gallium garnet
AU Raether, Robert G.; Prochnow, Eberhard R.
CS Lawrence Livermore Natl. Lab., Livermore, CA, 94550, USA
SO Applied Optics (1985), 24(21), 3420
CODEN: APOPAI; ISSN: 0003-6935
AB Polishing of Gd Ga garnet to obtain high damage level laser surfaces was achieved in 3 steps using: (1) a 7% mixture of 3-μm diamond powder in ethylene glycol applied with a dropping pipet; (2) a 7% mixture of 1-μm diamond powder in ethylene glycol; and (3) Nyacol colloidal silica, grade C-58 (50-mμm grit size) diluted 2:1 with distilled water. After polishing the surface smoothness was 1.6-3.3-Å rms with a slope of 8-14 Å **peak**-to-valley. The **flatness** was λ/10 or better at 6328 Å over the entire surface.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
IT **Memory devices**
(**magnetic** bubble, polishing technique for gadolinium gallium garnet for)